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Rebuilding American manufacturing—potential job gains by state and industry

Analysis of trade, infrastructure, and clean energy/ energy efficiency proposals

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This report examines the economic output and employment implications of a two-pronged strategy for rebuilding the domestic economy around high-wage jobs and restoring American manufacturing. Job losses due to growing U.S. trade deficits hit manufacturing industries particularly hard, shrinking the share of middle-class jobs available to workers without a college degree (Scott 2020; Scott and Mokhiber 2020). Failure to maintain and upgrade U.S. infrastructure investment has been a chronic weakness, hindering American public safety and productivity growth (ASCE 2017; Bivens 2014).[1]

The essential elements of this two-pronged strategy for rebuilding the domestic economy are detailed in this report and summarized here:

- **Trade and industrial policies that dramatically boost U.S. exports and eliminate the U.S. trade deficit**—now roughly $850 billion—within four years. At the heart of these policies are measures to end the overvaluation of the U.S. dollar and rebuild the competitiveness of U.S. manufacturing industries.
- **A four-year, $2 trillion program of investments in infrastructure, clean energy, and energy efficiency improvements.** This would include investments of $70.2 billion per year in schools and broadband, which would have substantial social benefits. Note also that virtually all (91.6%) of clean energy and energy efficiency investments are for manufactured products.

Following are the key findings of this report:

- **Surging exports and major investment in infrastructure, clean energy, and energy efficiency would support between 6.9 and 12.9 million U.S. jobs annually by 2024.** The lower-bound estimate includes direct and indirect jobs but not "respending" jobs created as consumers spend more in the economy.
- **Of the 6.9 million direct and indirect jobs, at least 471,200 would be construction jobs and 2.5 million would be U.S. manufacturing jobs.** Because the jobs supported would be concentrated in high-wage manufacturing (36.4% of jobs supported) and construction industries (6.8% of jobs supported), this

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strategy would help rebuild U.S. manufacturing and restructure the domestic economy away from low-wage service-sector work.

- **Projections of rapid export expansion are not wishful thinking: they are based on the actual export performance in prior periods when the real value of the U.S. dollar was substantially reduced.** And there is much room for the dollar to fall: its value has gained 21.4% since July 2014, stagnating U.S. exports and depressing domestic commodity prices, including farm products and incomes.
- **Rapidly growing exports in this forecast—especially for U.S. durable goods—along with substantial demand for manufactured products arising from infrastructure and clean energy and energy efficiency investments would support rapid growth in output and employment in a wide range of industries.** Rapidly rising demands for fabricated metal products, industrial machinery, computer and electrical products, and transportation equipment (including both motor vehicles and parts, and aerospace products), would generate substantial increases in demand for primary metals (ferrous and nonferrous) and other industrial materials. Production of U.S. energy-based products (crude oil, refined petroleum, and chemicals) also would increase rapidly.
- **Within manufacturing, jobs supported would be in both durable and nondurable goods categories.** Under the 6.9 million jobs scenario, rapidly growing sectors would include nondurable goods (367,600 jobs), and durable goods (2.1 million jobs). Within durable goods industries, the most jobs will be supported in nonelectrical machinery (436,700 jobs), fabricated metal products (383,700 jobs), transportation equipment (343,800 jobs), electrical equipment (302,700 jobs), and primary metals (248,000 jobs). Within primary metals, 69,900 jobs would be supported in the steel industry. Within transportation equipment will be substantial growth in motor vehicles and parts (188,800 jobs) and aerospace products (127,600 jobs).
- **Many sectors outside of manufacturing would experience substantial job growth:** transportation (603,400 jobs); agriculture, forestry, and fisheries (588,600 jobs); administrative and support services (454,900 jobs); professional, scientific, and support services (375,300 jobs); wholesale trade (337,100 jobs); and mining (201,400 jobs).
- **Rapidly growing exports supported by trade and industrial polices combined with major public investments in infrastructure, clean energy, and energy efficiency would support rapid job creation in all 50 states and the District of Columbia.** Jobs supported would be concentrated in regions that have been hardest hit by globalization and outsourcing. Six of the top 10 states in terms of jobs supported as a share of state employment are among the top 10 manufacturing states (as a share of total state employment), including Wisconsin (6.16%, 181,000 jobs), Indiana (5.95%, 185,900 jobs), Iowa (5.91%, 94,500 jobs), Michigan (5.55%, 251,200 jobs), Ohio (5.51%, 302,400 jobs), and Kentucky (5.37%, 104,100 jobs). Other top-10 job gainers are in energy and resource-intensive states, including North Dakota (6.07%, 24,300 jobs), Wyoming (5.69%, 16,700 jobs), Oklahoma (5.62%, 98,200 jobs), and South Dakota (5.61%, 24,600 jobs).
- **Our lower-bound estimate of 6.9 million jobs supported is conservative.** The Congressional Budget Office projects that it will take more than five years for

employment to return to its pre-recession levels (CBO 2020). In this kind of environment, increases in exports and deficit-financed public investments would generate additional rounds of respending and job creation in the domestic economy (Bivens 2014). Thus our upper-bound estimate of 12.9 million jobs, which includes about 6.0 million respending jobs, is plausible. It is important also to note that these jobs supported are jobs, not job years.[2]

Introduction: Policy proposals and modeling assumptions

This report evaluates a set of trade and manufacturing policy proposals developed by the Alliance for American Manufacturing (Paul et al. 2020). It also estimates the impacts of a package of infrastructure and clean energy proposals that is based on investments made under a detailed plan developed by the Sierra Club and other civil society groups but at a slightly smaller scale, and for fewer years. That plan, which was analyzed by the University of Massachusetts Amherst's Political Economy Research Institute (PERI) (Pollin and Chakraborty 2020), is a 10-year plan that would invest $683 billion per year in the elements considered here.[3] The plan analyzed here is a four-year, $2 trillion plan.

Trade flows and investment allocations for these activities were prepared in order to project output and employment changes over the 2019–2024 period and thus estimate the increased annual output and jobs supported by 2024, as described below.[4]

Defining jobs: supported vs. created vs. job years

In this report we are quite careful to distinguish between net jobs "created," and jobs "supported." In general, we choose to use the term jobs supported here, especially when talking about changes in the labor market several years in the future.

The use of "supported" reflects the fact that it is hard to assess the net employment effects of large macroeconomic changes like those assessed in this paper, especially when undertaken over a relatively long period (more than two years), and particularly with regard to changes due to trade flows. If unemployment is high and labor markets are slack over most of the period, investments or large increases in net exports will lead to net new job creation. If instead unemployment is low and labor markets are tight, then such changes instead will mostly change the composition of jobs, not the economywide level of employment. However, even if investments and increases in net exports happen when labor markets already are tight, the increase in labor demand will boost workers' leverage and bargaining power in labor markets and likely to lead to wage gains. Further, policymakers consistently have underestimated the amount of labor market slack in the U.S. economy for decades, so it is quite possible that net employment gains would be large from the changes assessed in this report even if headline unemployment looks low by historical levels. To account for some of this ambiguity of how the changes assessed in this paper will translate into either increased employment levels or different employment

composition, we use the term "jobs supported" throughout in this paper. Note that other studies of the economic impacts of proposed infrastructure and clean energy investments estimate the "Annual Job Creation" (also referred to as "job years") from these investments (Pollin and Chakraborty 2020, Table 1).

Jobs supported vs. job years

There is an important time dimension involved in measuring the employment impacts of the investment and spending flows examined in this report. Other researchers, in particular Pollin and Chakraborty (2020, 4), note that "an activity that generates 100 jobs for 1 year would create 100 job years. By contrast, the activity that produces 100 jobs for 10 years would generate 1,000 job years." In this study, we use the term "jobs supported" and treat all jobs supported as though they will continue in the future. Hence, employment estimates in this report should be interpreted as "jobs" rather than "job years."

Specifically, we estimate that the four-year, $2 trillion package of infrastructure and clean energy investments analyzed in this report would result in roughly 3.4 million direct and indirect job opportunities created—i.e., "jobs supported." These jobs would continue as long as spending continued at that level. They likely would cease to exist if this spending were eliminated.

Trade (export promotion and currency rebalancing) projections

Trade projections in this study assume that currency realignment and an aggressive program of industrial policies for recovery result in elimination of U.S. trade deficits in 2024. Currency overvaluation makes U.S. exports more expensive (and suppresses prices of domestic commodities, including gains), while also acting like a subsidy to the cost of all imports (Scott 2020). The policies proposed here are based, in part, on proposals to prioritize industrial policy in the post-COVID-19 world (Paul 2020), which emphasize substantial investment in American-made infrastructure, the reshoring of critical supply chains, enhanced enforcement of Buy America laws, and aggressive enforcement of fair trade policies and the pursuit of high-standard trade agreements. The trade projections are based on actual market behavior in earlier periods of dollar realignment.

For exports supported by currency rebalancing and industrial policies, we examined prior periods of substantial dollar devaluation, including 1985 to 1991 (following the Plaza Accord of 1985) and 2002 to 2008 (the previous period of substantial dollar overvaluation).[5] Total U.S. exports increased between 80% and 90% following each of those dollar realignments (Scott 2009 and 2017a). It is important to note that the real value of the U.S. dollar has gained 21.4% since July 2014, stagnating U.S. exports and depressing domestic commodity prices, including farm products and incomes (Federal Reserve Board 2020).

For the projections in this report, we first assumed that exports in each of the individual industries that make up the traded goods portion of the U.S. economy—technically, the

detailed, four-digit North American Industry Classification System (NAICS) traded goods industries—would grow at the rate experienced in the 2002–2008 period, with two exceptions, noted here.[6] We assume that imports would grow at their actual rate in the 2014–2019 period.[7] The initial projections would have resulted in a substantial trade surplus.[8] To bring projected trade flows into balance, initial projected exports were then reduced in each sector by 15.5%, resulting in overall trade balance in 2024, as shown in the tables in this report.[9]

Investment and clean energy projections

The allocation of the four-year, $2 trillion package of investments in infrastructure, clean energy, and efficiency improvement programs was based on allocations developed by Pollin and Chakraborty 2020.[10] That report assumes levels of public investment that are about 36% higher than is assumed here (here we look at overall spending of $500 billion a year versus overall spending of $683 billion per year in Pollin and Chakraborty 2020). But the allocations assumed here are in roughly the same proportions as in Pollin and Chakraborty 2020.[11] Details of these allocations are summarized in **Table 1.** (Table 3 shows the allocation of infrastructure and clean energy and efficiency spending by industry.) It is important to note that schools and broadband investments represent $70.2 billion (28.1%), or more than one-quarter of proposed infrastructure investments, which would generate substantial social benefits.

Overall economic and employment impacts of trade and investment proposals

Table 2 summarizes the overall impacts of all three components of the program proposed in this report. The top panel of the table shows the economic impact in billions of dollars, and the bottom panel shows the employment impact. The first set of rows in the top panel shows changes in trade flows from 2019 to 2024 resulting from the policies to end overvaluation of the U.S. dollar and rebalance trade. It is assumed that the real value of the U.S. dollar is reduced by approximately 25%, as discussed in the methodology appendix toward the end of this report. Total exports expand by 64.6% between 2019 (actual) and 2024 (projected), while imports increase by only 8.3%. As a result, goods trade balance is achieved in 2024, completely eliminating the U.S. goods trade deficit, which reached $854.3 billion in 2019.

The second set of rows in the top panel shows the economic impacts of the fourth year of the new $2 trillion in infrastructure, clean energy, and energy efficiency spending in 2024, reflecting the assumption that public spending on infrastructure and clean energy and energy efficiency investments increases by $500 billion per year in 2021, 2022, 2023, and 2024 ($250 billion per year for each of these purposes). In 2024, the $854.3 billion in increased economic output from rebalancing trade combined with the additional $500 billion yearly spending on infrastructure and clean energy/energy efficiency yields an additional $1.354 trillion in total spending on domestic goods and services (some of which will include imported components). This represents an increase of approximately 6.8% of

Table 1

Annual spending in year four of a four-year, $2 trillion infrastructure, clean energy, and energy efficiency program

Program category	Annual spending (billions$)
Infrastructure program elements	
Surface transportation	$105.9
Water/wastewater treatment	$10.1
Electricity	$17.0
Airports	$4.0
Inland waterways/ports	$1.4
Dams	$3.8
Hazardous and solid waste	$0.7
Levees	$6.7
Public parks and recreation	$9.8
Rail	$2.8
Schools	$36.5
Natural gas pipelines	$17.6
Broadband	$33.7
Total	**$250**
Renewable energy	
Wind	$84.4
Solar energy	$84.4
Geothermal energy	$18.8
Energy efficiency	
Building retrofits	$29.3
Industrial efficiency	$4.9
High-efficiency autos	$4.9
Land and agriculture	
Land restoration	$7.8
Agriculture	$15.6
Total	**$250**

Notes: This table takes the $500 billion that would be spent annually as part of a four-year, $2 trillion spending proposal and allocates it in proportion to spending assumptions in Sierra Club 2020, a report

Table 1 (cont.)

analyzed by the University of Massachusetts Amherst's Political Economy Research Institute (PERI) (Pollin and Chakraborty 2020). Totals may not sum due to rounding.

Source: Authors' analysis of Pollin and Chakraborty 2020 and Chakraborty 2020.

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GDP. It is worth repeating that this increase in spending will only require $500 billion per year in new federal spending; the rest results from increased foreign purchases of U.S. products. The final element of increased demand shown in the top panel of Table 2 is $812.6 billion in induced respending: roughly, how much additional spending happens as the $1.354 trillion in spending makes its way to workers and consumers' pockets and is respent on consumer goods and services. This figure assumes that there will be a macroeconomic multiplier of 1.6, i.e., a 60% boost to spending in the form of respending. Bivens (2014) reviews the economic literature on multipliers, and notes that infrastructure spending is found to have very high levels of economic multipliers.[12] A multiplier of 1.6 is used for that study. Spending on clean energy products, and output from additional U.S. exports, also are likely to have very high multipliers, for similar reasons. Note that multipliers depend in part on the level of excess capacity (economic distress) in the economy. Thus we do not include the multiplier (induced or respending) effects in our main results (jobs supported by industry and by state), but we do include them for informative purposes in our upper-bound estimate of jobs supported and in Table 2 and Table 4.

The employment impacts of these policies are summarized in the bottom panel of Table 2. Note that the employment effects include direct jobs supported or created by a given level of output (an aggregate of all industries) and the aggregate indirect jobs in industries that supply goods to directly affected industries (think auto assembly jobs and the jobs held by those who make auto parts, steel, and rubber, or who provide accounting, finance, staffing, or other services to auto manufacturers).

The U.S. goods trade deficit in 2019 displaced 5.1 million jobs. If trade is balanced, the number of jobs displaced by trade flows is reduced to 1.6 million jobs, for a net gain of 3.5 million direct and indirect jobs supported, as shown in column 3 (see the text box, "Defining jobs: supported vs. created vs. job years"). The reason that there still are jobs displaced under balanced trade is that U.S. imports are more labor intensive, on average, than U.S. exports, as predicted by trade theory, so the U.S. experiences a net loss of jobs.

Infrastructure investments of $250 billion in 2024 would support 2.1 million direct and indirect jobs, and clean energy and energy efficiency investments would support an additional 1.3 million direct and indirect jobs. Overall, the combination of export promotion (balanced goods trade), and expanded public investments will support a total of 6.9 million direct and indirect jobs. In addition, to the extent that multiplier effects are generated by these activities as workers spend their incomes in the economy, up to 6.0 million additional jobs could be supported by these activities. (As noted earlier, multiplier effects are stronger when the economy is struggling than when it is at full employment.)

The fourth and last data column in panel two of the table shows the results of jobs supported or created per category if we break down the additional 6.0 million induced

Table 2

Annual economic and employment impacts of promoting U.S. exports and investing in infrastructure, clean energy, and energy efficiency by 2024

	Economic impact (billions of dollars)			
	2019	2024	Change	Percent change
U.S. total exports (before and after export promotion policies)	$1,643.2	$2,704.9	$1,061.7	64.6%
U.S. general imports (before and after export promotion policies)	$2,497.5	$2,704.9	$207.4	8.3%
U.S. trade balance (before and after export promotion policies)	-$854.3	$0.0	$854.3	
Infrastructure investments (per year)	$0.0	$250.0	$250.0	
Clean energy and efficiency investments (per year)	$0.0	$250.0	$250.0	
Total new spending on domestic goods and services (per year)		$1,354.3	$1,354.3	
Total respending (60% of new domestic spending of $1,354.3 billion)			$812.6	
	Employment impact			
	2019	2024	Change	Total jobs with respending
U.S. total exports–jobs supported (before and after export promotion policies)	7,507,400	12,210,300	4,702,900	
U.S. general imports–jobs displaced (before and after export promotion policies)	12,647,400	13,842,100	1,194,700	
U.S. trade balance–net jobs supported (before and after export promotion policies)	-5,140,000	-1,631,800	3,508,200	6,571,600
Infrastructure investments (permanent jobs supported)*	0	2,071,600	2,071,600	3,880,600
Climate, clean energy and efficiency investments (permanent jobs supported)*	0	1,315,400	1,315,400	2,464,000
Total direct and indirect jobs supported			6,895,200	12,916,200
Respending jobs			6,021,000	
Range of potential jobs supported, including respending				6,895,200 to 12,916,200

* Investments and spending at these levels will support continuing employment as long as spending is

Table 2 (cont.)

sustained at this level in future years.

Note: Table estimates reflect changes in trade due to export promotion policies from baseline year 2019 and a four-year, $500 billion annual investment plan beginning in 2021.

Source: Authors' analysis of employment requirements overall and by industry (BLS-EP 2020a) applied to trade data (USITC 2020), authors' trade projections, and infrastructure and clean energy/energy efficiency investments at the allocations specified in Pollin and Chakraborty 2020. For a more detailed explanation of data sources and computations, see Table 1 and the text and the appendix in this report.

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respending jobs by each of the three program areas: export promotion, infrastructure investment, and clean energy/energy efficiency investment. If induced (multiplier) effects are included, trade rebalancing could support an additional 3.1 million jobs, meaning trade rebalancing has the potential to support between 3.5 million jobs (column three) and 6.6 million total jobs (column four). If the overall adjustment in the trade balance is less, then total jobs supported would be smaller. For example, if the trade deficit falls by half, then net export growth will support between 1.8 and 3.3 million additional net jobs.

Similarly, a $250 billion annual increase in infrastructure spending could support an additional 1.8 million respending jobs, meaning the infrastructure spending has the potential to support between 2.1 million jobs (column three) and 3.9 million jobs (column four) when direct, indirect, and induced (respending) jobs are included. Finally, spending on clean energy and energy efficiency could support between 1.3 million and 2.5 million net new jobs. The overall results —roughly 6.3 million direct, indirect, and respending jobs supported—are comparable with Pollin and Chakraborty 2020, when multiplier effects are included.[13]

Overall, the programs summarized in Table 2 will support a grand total of between 6.9 million and 12.9 million new jobs (depending on the overall level of macroeconomic multipliers in 2024 and thus respending jobs) if the U.S. trade deficit is eliminated in that year.

Economic impacts by industry

Overall economic impacts of the three trade and investment proposals by industry are summarized in **Tables 3** and **4**. Table 3 reports changes in imports, exports, and the trade balance from implementing export promotion policies that eliminate the trade deficit by 2024, and Table 4 reports how the $500 billion in new spending on infrastructure, clean energy, and energy efficiency in 2024 breaks down by industry.

The trade model is based on actual trade behavior during the 2002–2008 period, the last time the dollar experienced a sustained declined of about 25%. During this period, total U.S. goods exports increased 87.5%. The forecast assumes that exports at the industry level increased at the rate that prevailed in the 2002–2008 period (with few exceptions, explained in the notes and methodology appendix), and that imports in each sector increase at the rate that prevailed in the most recent 2014–2019 period (8.3%, in total, as shown in Table 2).[14] Finally, assumed export growth in each sector is further reduced by

Table 3

How export promotion would change U.S. goods trade with the world, by industry, 2019–2024

Industries	U.S. imports		U.S. exports		Trade balance	
	Change ($billions)	Share of total change	Change ($billions)	Share of total change	Change ($billions)	Share of total change
Total	$207.4	100.0%	$1,061.7	100.0%	$854.3	100.0%
Agriculture, forestry, fisheries	$6.1	3.0%	$68.0	6.4%	$61.9	7.2%
Mining	-$42.0	-20.3%	$127.5	12.0%	$169.5	19.8%
Oil and gas	-$41.7	-20.1%	$66.0	6.2%	$107.8	12.6%
Minerals and ores	-$0.3	-0.1%	$61.5	5.8%	$61.8	7.2%
Utilities	$0	0.0%	$0	0.0%	$0	0.0%
Construction	$0	0.0%	$0	0.0%	$0	0.0%
Manufacturing	$241.0	116.3%	$846.8	79.8%	$605.8	70.9%
Nondurable goods	$78.3	37.7%	$308.0	29.0%	$229.7	26.9%
Food and kindred products	$9.5	4.6%	$46.2	4.3%	$36.6	4.3%
Beverage and tobacco products	$5.1	2.5%	$7.9	0.7%	$2.8	0.3%
Textile mills and textile product mills	$2.8	1.4%	$2.0	0.2%	-$0.8	-0.1%
Apparel, leather and allied product Manufacturing	$1.4	0.7%	-$0.9	-0.1%	-$2.3	-0.3%
Paper	$0.4	0.2%	$8.0	0.8%	$7.6	0.9%
Printed matter and related products	$0.4	0.2%	$1.1	0.1%	$0.7	0.1%
Petroleum and coal products	-$9.2	-4.4%	$64.7	6.1%	$73.9	8.7%
Chemicals	$59.6	28.7%	$168.9	15.9%	$109.4	12.8%
Plastics and rubber products	$8.3	4.0%	$10.2	1.0%	$1.9	0.2%
Durable goods	$162.8	78.5%	$538.8	50.7%	$376.0	44.0%
Wood products	$1.3	0.6%	$1.4	0.1%	$0.1	0.0%
Nonmetallic mineral products	$2.4	1.1%	$3.7	0.4%	$1.4	0.2%
Primary metal	-$5.1	-2.5%	$114.1	10.7%	$119.2	14.0%
Fabricated metal products	$8.0	3.8%	$24.9	2.3%	$17.0	2.0%
Machinery, except electrical	$21.5	10.4%	$84.9	8.0%	$63.3	7.4%
Computer and electronic parts	$19.5	9.4%	$36.6	3.4%	$17.1	2.0%
Computer and peripheral equipment	$8.0	3.9%	-$0.8	-0.1%	-$8.8	-1.0%
Communications, audio and video equipment	-$0.3	-0.2%	$21.8	2.1%	$22.1	2.6%
Navigational, measuring, electromedical, and control instruments	$2.9	1.4%	$19.4	1.8%	$16.5	1.9%
Semiconductor and other electronic components & magnetic and optical media production	$9.0	4.3%	-$3.8	-0.4%	-$12.8	-1.5%

Table 3 (cont.)

Industries	U.S. imports		U.S. exports		Trade balance	
	Change ($billions)	Share of total change	Change ($billions)	Share of total change	Change ($billions)	Share of total change
Electrical equipment, appliances, and component	$20.2	9.7%	$28.9	2.7%	$8.7	1.0%
Transportation equipment	$42.1	20.3%	$146.2	13.8%	$104.1	12.2%
Motor vehicles and parts	$32.5	15.7%	$76.3	7.2%	$43.8	5.1%
Aerospace products and parts	$8.0	3.8%	$59.8	5.6%	$51.9	6.1%
Railroad, ship, and other transportation equipment	$1.6	0.8%	$10.1	0.9%	$8.5	1.0%
Furniture and fixtures	$7.5	3.6%	$3.8	0.4%	-$3.7	-0.4%
Miscellaneous manufactured commodities	$45.5	21.9%	$94.3	8.9%	$48.9	5.7%
Scrap and secondhand goods	$2.2	1.1%	$19.4	1.8%	$17.2	2.0%

Source: Authors' analysis of trade data (USITC 2020) and authors' projections for trade in 2024 given currency realignment and an aggressive program of industrial policies. For a more detailed explanation of policies, data sources, and computations, see report, especially "Trade projections" section, discussion of Table 2, and the methodology appendix.

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15.5% so as to achieve overall balance in goods trade in 2024. In other words, the model assumes that overall U.S. goods exports increase 64.6% between 2019 and 2024, as shown in the last column of Table 2.

Table 3 also reports each industry's share of the overall import growth, export growth, and trade balance change between 2019 and 2024. In terms of net changes in the trade balance, 70.9% of the improvement in the goods trade balance (i.e, the decrease in the goods trade deficit) takes place in the manufacturing sector, 7.2% is in agricultural products, and 19.8% is in mining (oil and gas is a big contributor, alone responsible for 12.6% of the increase in goods trade). Within manufacturing, petroleum and coal products, and chemicals—both essentially "refined energy products"—are together responsible for 21.5% of the total improvement in the trade balance. Finally, 44.0% of the improvement in the trade balance occurs in durable goods industries, which support many good, high-wage jobs, as discussed in the next section.

Table 4 reports the industry breakdown of the $500 billion in spending for infrastructure, clean energy, and energy efficiency in 2024, as noted above, as well as the economic output generated by the $812.6 billion in respending induced by the $1.354 trillion in spending from the trade rebalancing and infrastructure and clean energy/energy efficiency investments. Spending allocations for infrastructure, clean energy, and energy efficiency are scaled to proposals outlined in Pollin and Chakraborty 2020. Overall, 32.5% of planned spending for infrastructure is for construction services, as shown in the

addendum at the bottom of Table 4. Less than one quarter (22.8%) of infrastructure spending is for manufactured products. On the other hand, virtually all (91.6%) of clean energy and energy efficiency investments are for manufactured products.

The respending allocations assigned to each industry in the last data column are based on personal consumption expenditure data from the Bureau of Labor Statistics input–output tables (BLS-EP 2020b).[15] Respending is heavily weighted toward service industry purchases, and manufactured products account for just 12.4% of respending. These differences between the industry composition of investment spending and the industry composition of respending have important implications for the patterns of job creation in the model results, as discussed in the next section.

Job impacts by industry

Table 5 provides the industry breakdown of direct and indirect jobs supported by export promotion (rebalancing trade), infrastructure investments, and clean energy/energy efficiency investments.[16] The last two data columns in the table report the total direct and indirect jobs from all three categories combined and the total jobs supported in each industry as a share of the overall total jobs supported (it excludes jobs from respending).[17]

Overall, 6,895,200 jobs would be supported between 2019 and 2024 as a result of these three activities. More than one-third (36.4%) of the jobs supported would be in manufacturing, or 2,508,000 total jobs. In addition, 471,200 jobs (6.8% of the total) would be in construction. An overwhelming share (87.4%) of the 471,200 construction jobs supported are jobs supported by infrastructure investments (411,900).

Manufacturing and construction offer high wages with excellent benefits (Scott 2017b). Nearly half (43.2%) of the direct and indirect jobs supported by the programs outlined in this study would be in these high-wage industries (supporting a combined 2,979,200 jobs). Manufacturing and construction employed a total of 20,491,000 workers, or 13.4% of total nonfarm employment, in February 2020 (BLS 2020a). Thus, these programs, if enacted, would create a threefold increase in the rate at which the U.S. economy is generating good jobs for non-college-educated workers. This would help restructure the labor market toward more high-wage jobs for these workers.[18] Competition for these workers also would help pull up wages for all workers with similar characteristics in other industries, by tightening the labor market for non-college-educated workers.

The addendum at the bottom of Table 5 illustrates some of the differences and relative strengths of these three proposals for rebuilding the economy. Nearly two-fifths (39.5%, or 1,386,400 jobs) of the jobs supported by rebalancing trade would be in manufacturing. Roughly one-fifth of jobs supported by infrastructure investment will be in construction. And among the three programs considered here, infrastructure investment supports the smallest share of manufacturing jobs (14.4%, or 298,800 jobs). Clean energy and energy efficiency investments would support 1,315,400 jobs, nearly two-thirds of which (62.6%, or 822,800 jobs) would be in manufacturing. This is an important result for those concerned that clean energy proposals will hurt employment. Clean energy proposals substitute

Table 4

Total new spending on investments in infrastructure, clean energy, and energy efficiency, and respending from combined export promotion and investment proposals, by industry, 2024

	Infrastructure investments ($billions)	Clean energy and energy efficiency investments ($billions)	Respending (from $500 billion in investments and $854.3 billion improvement in net trade balance) ($billions)
Total	$250.0	$250.0	$812.6
Agriculture, forestry, fisheries	$0	$6.3	$4.6
Mining	$0	$3.8	$0
Oil and gas	$0	$3.8	$0
Minerals and ores	$0	$0	$0
Utilities	$13.6	$0	$16.2
Construction	$81.2	$1.6	$0
Manufacturing	$57.1	$229.1	$100.4
Nondurable goods	$1.0	$12.7	$79.5
Food and kindred products	$0	$0	$27.0
Beverage and tobacco products	$0	$0	$9.3
Textile mills and textile product mills	$0	$0	$1.4
Apparel, leather, and allied product manufacturing	$0	$0	$9.0
Paper	$0	$0	$1.3
Printed matter and related products	$0	$0	$0.3
Petroleum and coal products	$0	$0	$10.6
Chemicals	$0	$12.7	$18.7
Plastics and rubber products	$1.0	$0	$1.9
Durable goods	$56.1	$216.4	$20.9
Wood products	$0.0	$4.4	$0.3
Nonmetallic mineral products	$2.1	$0	$0.7
Primary metal	$1.0	$0	$0
Fabricated metal products	$1.0	$31.8	$1.2

Table 4 (cont.)

	Infrastructure investments ($billions)	Clean energy and energy efficiency investments ($billions)	Respending (from $500 billion in investments and $854.3 billion improvement in net trade balance) ($billions)
Machinery, except electrical	$0.4	$86.4	$0.4
Computer and electronic parts	$0	$21.1	$5.3
Computer and peripheral equipment	$0	$8.4	$2.5
Communications, audio, and video equipment	$0	$0	$2.2
Navigational, measuring, electromedical, and control instruments	$0	$0	$0.5
Semiconductor and other electronic components, and magnetic and optical media production	$0	$12.7	$0
Electrical equipment, appliances, and component	$20.3	$69.1	$2.4
Transportation equipment	$31.2	$3.7	$15.0
Motor vehicles and parts	$28.6	$3.7	$13.6
Aerospace products and parts	$1.4	$0	$0.0
Railroad, ship, and other transportation equipment	$1.2	$0	$1.3
Furniture and fixtures	$0	$0	$2.9
Miscellaneous manufactured commodities	$0	$0	-$7.3
Wholesale trade	$0	$0	$33.3
Retail trade	$0	$0	$84.7
Transportation	$44.7	$0	$18.7
Information	$16.8	$0	$30.2
Finance and insurance	$0	$0	$65.5
Real estate, and rental and leasing	$0	$0	$41.4

Table 4 (cont.)

	Infrastructure investments ($billions)	Clean energy and energy efficiency investments ($billions)	Respending (from $500 billion in investments and $854.3 billion improvement in net trade balance) ($billions)
Professional, scientific, and technical services	$2.6	$3.9	$11.0
Management of companies and enterprises	$0	$0	$0
Administrative and support and waste management and remediation services	$5.2	$4.7	$5.3
Education services	$21.9	$0	$21.5
Health care and social assistance	$0	$0	$158.8
Arts, entertainment, and recreation	$6.9	$0.8	$16.9
Accommodation and food services	$0	$0	$54.0
Other services	$0	$0	$37.8
Government	$0	$0	$107.5
Scrap and secondhand goods	$0	$0	$4.7
Addendum:			
Construction share	32.5%	0.6%	0.0%
Manufacturing share	22.8%	91.6%	12.4%

Note: Totals may not sum due to rounding.

Source: Authors' analysis of infrastructure and clean energy/energy efficiency investments at the allocations specified in Pollin and Chakraborty 2020. Respending applies multiplier from Bivens 2014 to these investments and authors' projections for trade in 2024 given currency realignment and an aggressive program of industrial policies. For a more detailed explanation of data sources and computations, see this report, especially Tables 1 and 2 and the methodology appendix.

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capital, and especially manufactured goods, as inputs instead of energy; these proposals also substitute wages for profits—traditional energy industries such as oil are among the most profitable in the United States.[19] To understand the potential benefits of clean energy job creation, consider that the coal mining industry in the United States employed only 50,400 workers, in total, in February 2020 (BLS 2020a). While targeted policies that help workers transition to new industries are clearly a necessary complement to these investment proposals, many of these workers displaced by shifting energy production easily could be absorbed by growing manufacturing industries in the United States if the clean energy proposal were implemented. Overall, 2.5 million manufacturing jobs would be created by these three proposals over the next four years, more than enough to absorb all workers displaced by reduced energy consumption.

Table 5

Industry breakdown of net jobs supported by rebalancing trade and investing in infrastructure, clean energy, and energy efficiency, 2024

	Total jobs supported				
	Rebalancing trade	Infrastructure investments	Clean energy/ energy efficiency investments	Total jobs supported	Share of total jobs gained
Total	3,508,200	2,071,600	1,315,400	6,895,200	100.0%
Agriculture, forestry, fisheries	540,300	6,300	42,000	588,600	8.5%
Mining	187,800	7,700	5,900	201,400	2.9%
Oil and gas	64,000	2,200	2,300	68,500	1.0%
Minerals and ores	123,800	5,500	3,600	132,900	1.9%
Utilities	16,700	16,900	3,100	36,700	0.5%
Construction	44,400	411,900	14,900	471,200	6.8%
Manufacturing	1,386,400	298,800	822,800	2,508,000	36.4%
Nondurable goods	289,200	35,400	43,000	367,600	5.3%
Food and kindred products	73,100	1,900	1,000	76,000	1.1%
Beverage and tobacco products	8,900	200	200	9,300	0.1%
Textile mills and textile product mills	7,600	2,000	4,000	13,600	0.2%
Apparel, leather, and allied product manufacturing	-14,600	900	300	-13,400	-0.2%
Paper	26,400	3,400	4,900	34,700	0.5%
Printed matter and related products	11,100	4,000	2,300	17,400	0.3%
Petroleum and coal products	17,400	2,000	600	20,000	0.3%
Chemicals	122,400	5,800	19,800	148,000	2.1%
Plastics and rubber products	37,000	15,100	10,000	62,100	0.9%
Durable goods	1,097,200	263,300	779,800	2,140,300	31.0%
Wood products	13,600	10,800	26,800	51,200	0.7%
Nonmetallic mineral products	16,800	20,900	7,100	44,800	0.6%
Primary metal	203,100	13,100	31,800	248,000	3.6%
Fabricated metal products	164,000	45,600	174,100	383,700	5.6%
Machinery, except electrical	183,500	11,000	242,200	436,700	6.3%
Computer and electronic parts	47,400	7,500	83,500	138,400	2.0%
Computer and peripheral equipment	-36,200	400	27,700	-8,100	-0.1%
Communications, audio, and video equipment	49,300	900	800	51,000	0.7%
Navigational, measuring, electromedical, and control instruments	50,600	1,300	3,300	55,200	0.8%
Semiconductor and other electronic components, and magnetic and optical media production	-16,300	4,900	51,700	40,300	0.6%
Electrical equipment, appliances, and components	44,000	62,600	196,100	302,700	4.4%
Transportation equipment	246,800	85,000	12,000	343,800	5.0%
Motor vehicles and parts	102,100	77,300	9,400	188,800	2.7%
Aerospace products and parts	122,100	3,400	2,100	127,600	1.9%
Railroad, ship, and other transportation equipment	22,500	4,300	500	27,300	0.4%
Furniture and fixtures	-17,300	4,900	2,700	-9,700	-0.1%

Table 5
(cont.)

	Total jobs supported				
	Rebalancing trade	Infrastructure investments	Clean energy/ energy efficiency investments	Total jobs supported	Share of total jobs gained
Miscellaneous manufactured commodities	195,300	2,000	3,500	200,800	2.9%
Wholesale trade	218,600	54,100	64,400	337,100	4.9%
Retail trade	57,000	42,200	11,000	110,200	1.6%
Transportation	197,600	354,300	51,500	603,400	8.8%
Information	28,100	34,300	9,800	72,200	1.0%
Finance and insurance	93,300	43,500	21,500	158,300	2.3%
Real estate, and rental and leasing	42,600	16,800	9,200	68,600	1.0%
Professional, scientific, and technical services	209,400	90,400	75,500	375,300	5.4%
Management of companies and enterprises	117,400	22,800	43,300	183,500	2.7%
Administrative and support and waste management and remediation services	222,600	139,800	92,500	454,900	6.6%
Education services	4,400	287,600	2,000	294,000	4.3%
Health care and social assistance	2,400	2,000	600	5,000	0.1%
Arts, entertainment, and recreation	9,700	58,000	8,700	76,400	1.1%
Accommodation and food services	45,400	22,400	14,800	82,600	1.2%
Other services	34,000	13,500	9,700	57,200	0.8%
Government	50,100	148,200	12,300	210,600	3.1%
Scrap and secondhand goods	0	0	0	0	0.0%
Addendum:					
Construction share	1.3%	19.9%	1.1%	6.8%	
Manufacturing share	39.5%	14.4%	62.6%	36.4%	
Jobs per million dollars	4.11	8.29	5.26	5.09	
Total primary spending injection (billions of dollars)	$854.4	$250.0	$250.0	$1,354.4	

Note: Table estimates the employment effects of changes in trade due to export promotion policies from baseline year 2019 and a four-year, $500 billion annual investment plan beginning in 2021. Infrastructure, and clean energy and energy efficiency investments at the levels specified in Table 4 will support continuing employment at levels identified in this table as long as spending is sustained at specified levels in future years. Respending effects are excluded.

Source: Authors' analysis of employment requirements by industry (BLS-EP 2020a) applied to trade data (USITC 2020) and authors' projections for trade in 2024 given currency realignment and an aggressive program of industrial policies, and to infrastructure and clean energy/energy efficiency investments at the allocations specified in Pollin and Chakraborty 2020. For a more detailed explanation of data sources and computations, see this report, especially Tables 1–4 and the methodology appendix.

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A state-by-state breakdown of job creation

Rebalancing trade, rebuilding U.S. infrastructure, and investing in clean energy and energy efficiency would generate significant job growth in all 50 states and in the District of Columbia, as shown in **Table 6** and the interactive map in **Figure A.** Job gains would range from 6.16 % of total employment (or 181,000 jobs supported) in Wisconsin down to 2.85% of employment (or 10,200 jobs supported) in Washington, D.C., as shown in Table 6, which

ranks states by jobs supported, as a share of total state employment. In general, job growth would be concentrated in the manufacturing-intensive areas of the country in the upper Midwest and the South which have been hardest hit by globalization and outsourcing, and especially by growing imports from China (Scott and Mokhiber 2020). Certain energy-producing states (i.e., North Dakota, South Dakota, Wyoming, and Oklahoma) are also in the top 10 job-gaining states.

The model used in this study assumes that construction spending, which is prominent in the infrastructure proposal, will be proportional to current distributions of construction and manufacturing employment by state. Actual results could vary if infrastructure and clean energy spending are allocated based on need, and if spending programs are used to redress existing patterns of racial and gender discrimination. The past is not prologue, in these cases, despite the structure of the model revealed in Table 2. Policy can change the distribution of jobs shown.

Supplemental Table A at the end of this report provides total jobs supported per state ranked by the total number of jobs supported. Jobs supported are in general proportional to total employment, so the states with the largest populations (California, Texas, New York, Florida, and Illinois) make up the top five on this list. **Supplemental Table B** ranks states alphabetically, and reports the same results shown in Table 6.

Table 6

Net jobs supported by rebalancing trade and investing in infrastructure, clean energy, and energy efficiency in 2024, by state (ranked by jobs gained by share of total state employment)

Rank	State	Change in trade balance	Infrastructure	Clean energy / energy efficiency	Total jobs supported	State employment (2013–2017 5-year ACS estimate)	Jobs supported as a share of employment
1	*Wisconsin*	93,300	40,800	46,900	181,000	2,939,900	6.16%
2	*North Dakota*	15,400	5,200	3,700	24,300	400,500	6.07%
3	*Indiana*	99,000	49,500	37,400	185,900	3,124,300	5.95%
4	*Iowa*	52,000	21,400	21,100	94,500	1,599,700	5.91%
5	*Wyoming*	11,000	4,000	1,700	16,700	293,600	5.69%
6	*Oklahoma*	55,600	24,700	17,900	98,200	1,746,400	5.62%
7	*South Dakota*	14,900	5,500	4,200	24,600	438,300	5.61%
8	*Michigan*	128,800	73,100	49,300	251,200	4,524,900	5.55%
9	*Ohio*	152,600	79,900	69,900	302,400	5,488,200	5.51%
10	*Kentucky*	52,600	30,400	21,000	104,100	1,938,200	5.37%
11	*Kansas*	43,200	18,900	13,500	75,600	1,420,000	5.32%
12	*Arkansas*	35,600	17,500	12,900	66,100	1,276,500	5.18%
13	*Nebraska*	29,100	13,200	8,500	50,800	987,200	5.15%
14	*Illinois*	156,600	87,600	69,800	314,000	6,181,700	5.08%
15	*Mississippi*	30,900	18,200	12,100	61,100	1,221,800	5.00%
16	*Alabama*	53,600	30,400	18,700	102,700	2,055,500	5.00%
17	*Minnesota*	76,200	37,300	31,400	144,900	2,904,100	4.99%
18	*Idaho*	21,100	9,800	6,400	37,300	748,700	4.98%
19	*South Carolina*	52,200	31,800	24,500	108,500	2,181,000	4.97%
20	*Tennessee*	70,500	46,400	32,100	149,000	2,996,600	4.97%
21	*Texas*	328,000	181,700	108,400	618,100	12,689,100	4.87%
22	*Pennsylvania*	150,700	82,600	62,400	295,700	6,097,000	4.85%
23	*Montana*	14,800	6,500	2,800	24,100	498,000	4.84%
24	*New Hampshire*	16,200	9,700	8,500	34,400	713,400	4.82%
25	*Washington*	93,300	45,000	25,200	163,600	3,418,100	4.79%
26	*Missouri*	69,200	39,600	28,100	136,900	2,867,400	4.77%
27	*Oregon*	47,400	23,800	18,900	90,000	1,886,000	4.77%
28	*Utah*	33,700	19,700	10,700	64,100	1,412,200	4.54%
29	*Louisiana*	51,100	27,500	12,900	91,400	2,031,200	4.50%
30	*West Virginia*	18,800	9,800	5,000	33,600	747,000	4.50%
31	*Connecticut*	40,100	23,500	16,900	80,500	1,805,100	4.46%
32	*North Carolina*	97,000	62,400	43,900	203,400	4,571,000	4.45%
33	*Georgia*	98,000	66,900	39,900	204,700	4,606,300	4.44%
34	*Alaska*	8,700	5,300	1,600	15,600	354,000	4.41%
35	*California*	411,200	234,400	144,100	789,700	17,993,900	4.39%
36	*Colorado*	61,100	37,400	19,900	118,400	2,760,100	4.29%
37	*Vermont*	6,800	4,300	2,900	14,000	327,300	4.28%
38	*Rhode Island*	10,700	6,600	4,500	21,800	526,100	4.14%
39	*Maine*	13,900	8,100	4,200	26,300	658,700	3.99%

Table 6
(cont.)

Rank	State	Change in trade balance	Infrastructure	Clean energy / energy efficiency	Total jobs supported	State employment (2013–2017 5-year ACS estimate)	Jobs supported as a share of employment
40	*Arizona*	57,600	39,500	20,400	117,400	2,953,900	3.97%
41	*New Mexico*	18,900	11,300	4,600	34,900	879,200	3.97%
42	*New Jersey*	81,200	59,000	29,200	169,300	4,388,000	3.86%
43	*Massachusetts*	62,700	43,800	28,800	135,400	3,525,700	3.84%
44	*Virginia*	72,500	56,000	25,800	154,300	4,084,000	3.78%
45	*Florida*	158,700	119,400	53,600	331,700	9,018,600	3.68%
46	*Delaware*	8,000	5,600	2,600	16,100	441,500	3.65%
47	*Nevada*	22,400	17,800	7,300	47,500	1,341,400	3.54%
48	*New York*	151,200	122,800	60,300	334,300	9,467,600	3.53%
49	*Maryland*	45,800	42,000	15,400	103,200	3,040,800	3.39%
50	*Hawaii*	10,300	9,200	2,500	22,000	671,800	3.27%
51	*District of Columbia*	4,200	4,600	1,400	10,200	357,700	2.85%
	Total	3,508,200	2,071,600	1,315,400	6,895,200	150,599,200	4.58%

Note: Totals may vary slightly due to rounding. Percentages are calculated using rounded totals.

Source: Authors' analysis of employment requirements by industry (BLS-EP 2020a) applied to trade data (USITC 2020) and authors' projections for trade in 2024 given currency realignment and an aggressive program of industrial policies, and to infrastructure and clean energy/energy efficiency investments at the allocations specified in Pollin and Chakraborty 2020. American Community Survey (ACS) data (U.S. Census Bureau 2019) are used to estimate state jobs and shares supported. For a more detailed explanation of data sources and computations, see this report, especially Tables 1–5 and the methodology appendix.

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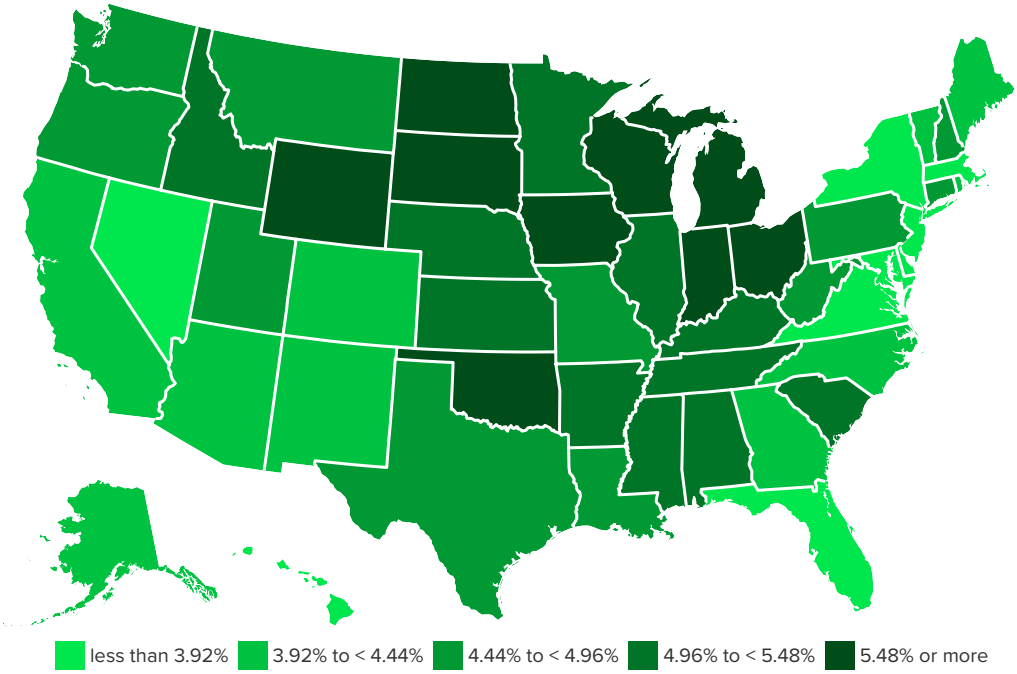
Figure A

Net jobs created as a share of employment by rebalancing trade and investing in infrastructure, clean energy, and energy efficiency, by state



Source: See Table 6 in this report (*Rebuilding American Manufacturing—Potential Job Gains by State and Industry* by Scott, Mokhiber, and Perez, 2020).

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Conclusion

Rebalancing trade by expanding exports, and expanding public investments in infrastructure, clean energy, and energy efficiency, are the keys to generating at least 6.9 million good jobs, rebuilding American manufacturing and the U.S. economy.

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Appendix: Methodology

The trade, investment, and employment analyses in this report are based on a detailed, industry-based study of the relationships between changes in trade and investment flows and employment for each of approximately 205 individual industries of the U.S. economy, specially grouped into 44 custom sectors, and using the North American Industry Classification System (NAICS) with data obtained from the U.S. Census Bureau (2019) and the U.S. International Trade Commission (USITC 2020).

This model was developed to analyze the employment impacts of trade flows on the domestic economy by Scott and Mokhiber (2020). It is adapted and extended here to examine the impacts of other types of spending, including infrastructure, clean energy, and induced respending (personal consumption expenditures or PCE) and multiplier effects. The underlying input-output and employment requirements models used to study trade effects are perfectly well suited to the study of domestic investment changes as well.

The number of jobs supported or displaced by $1 million of exports, imports, or other spending for each of 205 different U.S. industries is estimated using a labor requirements model derived from an input–output table developed by the BLS-EP (2020a).[20] This model includes both the direct effects of changes in output (for example, the number of jobs supported by $1 million worth of auto assembly output) and the indirect effects on industries that supply goods (for example, goods used in the manufacture of cars). So, in the auto industry for example, the indirect impacts include jobs in auto parts, steel, and rubber, as well as service industries such as accounting, finance, computer programming, and staffing and temporary help agencies that provide inputs to the motor vehicle manufacturing companies. This model estimates the labor content of trade or other spending using empirical estimates of labor content and goods flows between U.S. industries in a given base year (an input–output table for the year 2019 was used in this study) that were developed by the U.S. Department of Commerce and the BLS-EP. It is not a statistical survey of actual jobs gained or lost in individual companies, or the opening or closing of particular production facilities (Bronfenbrenner and Luce 2004 is one of the few studies based on news reports of individual plant closings).

Only nominal trade and expenditure data and nominal employment requirements tables are used in this analysis. Inflation and productivity growth were ignored, in the absence of complete price and productivity projections.

The steps followed to estimate the economic and employment impacts of investments in infrastructure, and in clean energy and energy efficiency, are similar to the steps followed to estimate the economic and employment impacts of trade.

Data requirements for trade and for investments

The text below follows the step-by-step process for developing the data for analyzing all three proposals, with Steps 1 through 3 applying only to trade flows.

Step 1. U.S. trade data are obtained from the U.S. International Trade Commission DataWeb (USITC 2020) in four-digit NAICS formats. General imports and total exports are downloaded for each year.

Step 2. Trade projections are developed based on actual market behavior in earlier periods, as described in the text, above.

Step 3. To conform to the BLS Employment Requirements tables (BLS-EP 2020a), trade data must be converted into the BLS industry classifications system. For NAICS-based data, there are 205 BLS industries. The data then are mapped from NAICS industries onto their respective BLS sectors.

Step 4. Data on expenditures for investments in infrastructure, clean energy, and energy efficiency improvements and for respending were collected as described in the text and in tables 1 and 4, above. Expenditure data were translated into four-digit NAICS industries and then mapped onto their respective BLS sectors.

Step 5. Nominal domestic employment requirements tables are downloaded from the BLS-EP (2020a). These matrices are input–output industry-by-industry tables that show the employment requirements for $1 million in outputs in nominal 2019 dollars. So, for industry *i* the *aij* entry is the employment indirectly supported in industry *i* by final sales in industry *j* and, where *i=j*, the employment directly supported.

Analysis of trade and investment impacts

Step 1. Job equivalents. For the trade analysis, BLS trade data are compiled into matrices. Let $[T_{2019}]$ be the 205×2 matrix made up of a column of imports and a column of exports for 2019. $[T_{2024}]$ is defined as the 205×2 matrix of 2024 trade estimates. Define $[E_{2019}]$ as the 205×205 matrix consisting of the nominal 2019 domestic employment requirements tables. To estimate the jobs supported or displaced by trade, perform the following matrix operations:

$$[J_{2019}] = [T_{2019}] \times [E_{2019}]$$

$$[J_{2024}] = [T_{2024}] \times [E_{2019}]$$

$[J_{2019}]$ is a 205×2 matrix of job displacement by imports and jobs supported by exports for each of 205 industries in 2019. Similarly, $[J_{2024}]$ is a 205×2 matrix of jobs displaced or supported by imports and exports (respectively) for each of 205 industries in 2024.

A similar analysis is performed for infrastructure, clean energy, and energy efficiency investments, and for respending (PCE) as described above. The investments are all assumed to result in net increases in jobs supported by domestic spending.

To estimate jobs supported/displaced over certain time periods, we perform the following operations:

$$[J_{nx19\text{-}24}] = [J_{2019}] - [J_{2024}]$$

Step 2. State-by-state analysis. For states, pooled (five-year) estimates of employment-by-industry data are obtained from the Census Bureau's American Community Survey (ACS) data for the 2013–2017 period (U.S. Census Bureau 2019) and are mapped into 44 unique census industries and seven aggregated total and subtotals, for a total of 52 sectors (including scrap, not part of the census analysis) (Data Planet 2019).[21]

Previous reports examining employment impacts of trade flows (Kimball and Scott 2014; Scott and Mokhiber 2018) relied on single-year estimates, based on ACS 2011 data, of employment by industry, state, and congressional district. This model has been completely reestimated in this version of the report with the newer ACS five-year data referenced above. These data provide substantially better detail, and greatly improved accuracy, in the form of much lower levels of variance for employment estimates at every level of detail in the model. The new estimates also reflect congressional district boundaries for the 115th Congress for most districts in the country. Boundaries changed in only a few districts in Pennsylvania and Colorado between the 115th Congress and the current 116th Congress.[22]

We look at net jobs supported from 2019 to 2024, so from this point, we use $[J_{nx19\text{-}24}]$. In order to work with 44 sectors, we group the 205 BLS industries into a new matrix, defined as $[Jnew_{19\text{-}24}]$, a 44×2 matrix of job support numbers.

Jobs supported by infrastructure and clean energy/energy efficiency investments are added to net jobs supported by trade for the state analysis and combined into the separate vectors shown in Table 6 and Supplemental Tables A and B.

We define $[St_{2013\text{-}2017}]$ as the 44×51 matrix of state employment shares (with the addition of the District of Columbia) of employment in each industry calculated from the ACS five-year employment estimates. We calculate:

$$[Stj_{nx19\text{-}24}] = [St_{2013\text{-}2017}]T\,[Jnew_{19\text{-}24}]$$

where $[Stj_{nx19\text{-}24}]$ is the 44×51 matrix of job displacement/support by state and by industry. To get state total jobs supported, we add up the subsectors in each state.

Jobs supported by infrastructure and clean energy investments are added to net jobs supported by trade for the state analysis, shown separately in Table 6 and Supplemental Tables A and B, and then combined into one final vector for the calculation of total jobs gained as a share of total state employment.

Supplemental Table A

Net jobs supported by rebalancing trade and investing in infrastructure, clean energy, and energy efficiency, by state, 2024 (ranked by net jobs gained)

Rank	State	Change in trade balance	Infrastructure	Clean energy/ energy efficiency	Total jobs supported	State employment (2013–2017 5-year ACS estimate)	Jobs supported as a share of employment
1	*California*	411,200	234,400	144,100	789,700	17,993,900	4.39%
2	*Texas*	328,000	181,700	108,400	618,100	12,689,100	4.87%
3	*New York*	151,200	122,800	60,300	334,300	9,467,600	3.53%
4	*Florida*	158,700	119,400	53,600	331,700	9,018,600	3.68%
5	*Illinois*	156,600	87,600	69,800	314,000	6,181,700	5.08%
6	*Ohio*	152,600	79,900	69,900	302,400	5,488,200	5.51%
7	*Pennsylvania*	150,700	82,600	62,400	295,700	6,097,000	4.85%
8	*Michigan*	128,800	73,100	49,300	251,200	4,524,900	5.55%
9	*Georgia*	98,000	66,900	39,900	204,700	4,606,300	4.44%
10	*North Carolina*	97,000	62,400	43,900	203,400	4,571,000	4.45%
11	*Indiana*	99,000	49,500	37,400	185,900	3,124,300	5.95%
12	*Wisconsin*	93,300	40,800	46,900	181,000	2,939,900	6.16%
13	*New Jersey*	81,200	59,000	29,200	169,300	4,388,000	3.86%
14	*Washington*	93,300	45,000	25,200	163,600	3,418,100	4.79%
15	*Virginia*	72,500	56,000	25,800	154,300	4,084,000	3.78%
16	*Tennessee*	70,500	46,400	32,100	149,000	2,996,600	4.97%
17	*Minnesota*	76,200	37,300	31,400	144,900	2,904,100	4.99%
18	*Missouri*	69,200	39,600	28,100	136,900	2,867,400	4.77%
19	*Massachusetts*	62,700	43,800	28,800	135,400	3,525,700	3.84%
20	*Colorado*	61,100	37,400	19,900	118,400	2,760,100	4.29%
21	*Arizona*	57,600	39,500	20,400	117,400	2,953,900	3.97%
22	*South Carolina*	52,200	31,800	24,500	108,500	2,181,000	4.97%
23	*Kentucky*	52,600	30,400	21,000	104,100	1,938,200	5.37%
24	*Maryland*	45,800	42,000	15,400	103,200	3,040,800	3.39%
25	*Alabama*	53,600	30,400	18,700	102,700	2,055,500	5.00%
26	*Oklahoma*	55,600	24,700	17,900	98,200	1,746,400	5.62%
27	*Iowa*	52,000	21,400	21,100	94,500	1,599,700	5.91%
28	*Louisiana*	51,100	27,500	12,900	91,400	2,031,200	4.50%
29	*Oregon*	47,400	23,800	18,900	90,000	1,886,000	4.77%
30	*Connecticut*	40,100	23,500	16,900	80,500	1,805,100	4.46%
31	*Kansas*	43,200	18,900	13,500	75,600	1,420,000	5.32%
32	*Arkansas*	35,600	17,500	12,900	66,100	1,276,500	5.18%
33	*Utah*	33,700	19,700	10,700	64,100	1,412,200	4.54%
34	*Mississippi*	30,900	18,200	12,100	61,100	1,221,800	5.00%
35	*Nebraska*	29,100	13,200	8,500	50,800	987,200	5.15%
36	*Nevada*	22,400	17,800	7,300	47,500	1,341,400	3.54%
37	*Idaho*	21,100	9,800	6,400	37,300	748,700	4.98%
38	*New Mexico*	18,900	11,300	4,600	34,900	879,200	3.97%
39	*New Hampshire*	16,200	9,700	8,500	34,400	713,400	4.82%
40	*West Virginia*	18,800	9,800	5,000	33,600	747,000	4.50%
41	*Maine*	13,900	8,100	4,200	26,300	658,700	3.99%

Supplemental Table A (cont.)

Rank	State	Change in trade balance	Infrastructure	Clean energy/ energy efficiency	Total jobs supported	State employment (2013–2017 5-year ACS estimate)	Jobs supported as a share of employment
42	*South Dakota*	14,900	5,500	4,200	24,600	438,300	5.61%
43	*North Dakota*	15,400	5,200	3,700	24,300	400,500	6.07%
44	*Montana*	14,800	6,500	2,800	24,100	498,000	4.84%
45	*Hawaii*	10,300	9,200	2,500	22,000	671,800	3.27%
46	*Rhode Island*	10,700	6,600	4,500	21,800	526,100	4.14%
47	*Wyoming*	11,000	4,000	1,700	16,700	293,600	5.69%
48	*Delaware*	8,000	5,600	2,600	16,100	441,500	3.65%
49	*Alaska*	8,700	5,300	1,600	15,600	354,000	4.41%
50	*Vermont*	6,800	4,300	2,900	14,000	327,300	4.28%
51	*District of Columbia*	4,200	4,600	1,400	10,200	357,700	2.85%
	Total	3,508,200	2,071,600	1,315,400	6,895,200	150,599,200	4.58%

Note: Percentages are calculated using rounded totals. Totals may vary slightly due to rounding.

Source: Authors' analysis of employment requirements by industry (BLS-EP 2020a) applied to trade data (USITC 2020) and authors' projections for trade in 2024 given currency realignment and an aggressive program of industrial policies, and to infrastructure and clean energy/energy efficiency investments at the allocations specified in Pollin and Chakraborty 2020. American Community Survey (ACS) data (U.S. Census Bureau 2019) are used to estimate state jobs and shares supported. For a more detailed explanation of data sources and computations, see this report, especially Tables 1–5 and the methodology appendix.

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Supplemental Table B

Net jobs supported by rebalancing trade and investing in infrastructure, clean energy, and energy efficiency, by state, 2024 (sorted alphabetically)

State	Change in trade balance	Infrastructure	Clean energy/ efficiency	Total jobs	State employment (2013–2017 5-year ACS estimate)	Jobs supported as a share of total employment
Alabama	53,600	30,400	18,700	102,700	2,055,500	5.00%
Alaska	8,700	5,300	1,600	15,600	354,000	4.41%
Arizona	57,600	39,500	20,400	117,400	2,953,900	3.97%
Arkansas	35,600	17,500	12,900	66,100	1,276,500	5.18%
California	411,200	234,400	144,100	789,700	17,993,900	4.39%
Colorado	61,100	37,400	19,900	118,400	2,760,100	4.29%
Connecticut	40,100	23,500	16,900	80,500	1,805,100	4.46%
Delaware	8,000	5,600	2,600	16,100	441,500	3.65%
District of Columbia	4,200	4,600	1,400	10,200	357,700	2.85%
Florida	158,700	119,400	53,600	331,700	9,018,600	3.68%
Georgia	98,000	66,900	39,900	204,700	4,606,300	4.44%
Hawaii	10,300	9,200	2,500	22,000	671,800	3.27%
Idaho	21,100	9,800	6,400	37,300	748,700	4.98%
Illinois	156,600	87,600	69,800	314,000	6,181,700	5.08%
Indiana	99,000	49,500	37,400	185,900	3,124,300	5.95%
Iowa	52,000	21,400	21,100	94,500	1,599,700	5.91%
Kansas	43,200	18,900	13,500	75,600	1,420,000	5.32%
Kentucky	52,600	30,400	21,000	104,100	1,938,200	5.37%
Louisiana	51,100	27,500	12,900	91,400	2,031,200	4.50%
Maine	13,900	8,100	4,200	26,300	658,700	3.99%
Maryland	45,800	42,000	15,400	103,200	3,040,800	3.39%
Massachusetts	62,700	43,800	28,800	135,400	3,525,700	3.84%
Michigan	128,800	73,100	49,300	251,200	4,524,900	5.55%
Minnesota	76,200	37,300	31,400	144,900	2,904,100	4.99%
Mississippi	30,900	18,200	12,100	61,100	1,221,800	5.00%
Missouri	69,200	39,600	28,100	136,900	2,867,400	4.77%
Montana	14,800	6,500	2,800	24,100	498,000	4.84%
Nebraska	29,100	13,200	8,500	50,800	987,200	5.15%
Nevada	22,400	17,800	7,300	47,500	1,341,400	3.54%
New Hampshire	16,200	9,700	8,500	34,400	713,400	4.82%
New Jersey	81,200	59,000	29,200	169,300	4,388,000	3.86%
New Mexico	18,900	11,300	4,600	34,900	879,200	3.97%
New York	151,200	122,800	60,300	334,300	9,467,600	3.53%
North Carolina	97,000	62,400	43,900	203,400	4,571,000	4.45%
North Dakota	15,400	5,200	3,700	24,300	400,500	6.07%
Ohio	152,600	79,900	69,900	302,400	5,488,200	5.51%
Oklahoma	55,600	24,700	17,900	98,200	1,746,400	5.62%
Oregon	47,400	23,800	18,900	90,000	1,886,000	4.77%
Pennsylvania	150,700	82,600	62,400	295,700	6,097,000	4.85%
Rhode Island	10,700	6,600	4,500	21,800	526,100	4.14%
South Carolina	52,200	31,800	24,500	108,500	2,181,000	4.97%

Supplemental Table B (cont.)

State	Change in trade balance	Infrastructure	Clean energy/ efficiency	Total jobs	State employment (2013–2017 5-year ACS estimate)	Jobs supported as a share of total employment
South Dakota	14,900	5,500	4,200	24,600	438,300	5.61%
Tennessee	70,500	46,400	32,100	149,000	2,996,600	4.97%
Texas	328,000	181,700	108,400	618,100	12,689,100	4.87%
Utah	33,700	19,700	10,700	64,100	1,412,200	4.54%
Vermont	6,800	4,300	2,900	14,000	327,300	4.28%
Virginia	72,500	56,000	25,800	154,300	4,084,000	3.78%
Washington	93,300	45,000	25,200	163,600	3,418,100	4.79%
West Virginia	18,800	9,800	5,000	33,600	747,000	4.50%
Wisconsin	93,300	40,800	46,900	181,000	2,939,900	6.16%
Wyoming	11,000	4,000	1,700	16,700	293,600	5.69%
Total	3,508,200	2,071,600	1,315,400	6,895,200	150,599,200	4.58%

Note: Percentages are calculated using rounded totals. Totals may vary slightly due to rounding.

Source: Authors' analysis of employment requirements by industry (BLS-EP 2020a) applied to trade data (USITC 2020) and authors' projections for trade in 2024 given currency realignment and an aggressive program of industrial policies, and to infrastructure and clean energy/energy efficiency investments at the allocations specified in Pollin and Chakraborty 2020. American Community Survey (ACS) data (U.S. Census Bureau 2019) are used to estimate state jobs and shares supported. For a more detailed explanation of data sources and computations, see this report, especially Tables 1–5 and the appendix.

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Endnotes

1. The plans examined in this report have long been needed, but would be especially effective at the present time, due to the depressed state of the U.S. labor market (BLS 2020b).

2. See text box, "Defining jobs: Supported vs. created vs. job years," and discussion there of jobs supported versus job years.

3. The PERI group has published a number of detailed studies of the impacts of clean energy programs at the state, national, and global levels, including *Green Growth* (Pollin, Garrett-Peltier, Heintz, and Hendriks 2014), and *Climate Crisis and the Global Green New Deal* (Chomsky and Pollin 2020).

4. The year 2019 is chosen as the base period for this study because that is the last year for which we have complete trade data.

5. See Scott 2009, especially Figure A, for further review of the history of the Plaza Accord and currency realignment in the 2002–2008 period. See Bergsten and Gagnon 2012 for an analysis of the impacts of currency manipulation on the U.S. economy and global trade flows. There are several tools available to combat currency manipulation and offset dollar misalignment (Scott 2017a). One of the most effective and direct methods is to tax foreign investment. Recently, Sens. Tammy Baldwin (D-Wis.) and Josh Hawley (R-Mo.) introduced bipartisan legislation to address the twin problems of an overvalued dollar and growing trade imbalances. Their bill would empower the Federal Reserve to tax new foreign purchases of U.S. stocks, bonds, and other assets—which could return the dollar to a competitive, trade-balancing level (Hansen 2017; Scott 2019).

6. See Methodology Appendix for discussion of NAICs industries and trade data sources. Actual exports of energy products increased extremely rapidly between 2002 and 2008, from a very tiny base, including crude oil (which increased 395%) and refined petroleum products (which increased 632%). By 2019, exports of these products had increased very substantially, to $95.7 billion and $93.8 billion, respectively. Use of historical growth rates for these sectors would have overwhelmed the forecast. Therefore, the initial forecast is that exports of each of these products would double between 2019 and 2024, and then adjust downward by 15.5% in 2024, as described in the text.

7. Total U.S. goods imports increased only 6.0% between 2014 and 2019. Currency realignment will increase the prices of imports, limiting additional consumption of imported products to at most recent trend growth in imports. Note that imports increased rapidly in the 2002–2008 period due to currency manipulation by China and other Asian countries, and extensive unfair trade policies, which limited the decline of the U.S. trade deficit in that period. We assume in this forecast that the dollar falls against all major surplus currencies here, including the Chinese yuan, Japanese yen, Korean won, and the euro, and that fair-trade enforcement otherwise prevents and unwinds unfair import trade. (Authors' analysis of USITC 2020).

8. The initial projection resulted in a 94.8% increase in total exports between 2019 and 2024, using the weighted average of actual 2002–2008 growth rates, and an 8.3% increase in imports, resulting in an initial projected surplus of $496.7 billion.

9. It should be noted that the 2019–2024 period is one year shorter than the 2002–2008 period mentioned above, so it is reasonable to assume that future export growth will be less than in the reference period.

10. The Sierra Club (2020) plan is detailed but is at a higher spending level and for a longer period of time than the plan considered here, which is based on a four-year, $2 trillion climate and infrastructure investment proposal.

11. The authors thanks Robert Pollin and Shouvik Chakraborty for additional details about model assumptions (Chakraborty 2020). The final version of that report also evaluates a proposed investment of $186 billion per year in agricultural and land restoration investments that are not included here. The program considered here includes a much smaller component of agricultural programs, for energy conservation, as noted below. Individual modeling elements were converted from the IMPLAN 546 modeling format to the Bureau of Labor Statistics formal modeling of 205 individual industries of the U.S. economy; this conversion was implemented using IMPLAN to NAICS crosswalks.

12. The actual level of respending achieved could be higher or lower than shown in Table 2 and elsewhere in this report. The actual size of the multiplier will depend on the level economic activity when the spending takes place. See the text box, "Defining jobs: Supported vs. created vs. job years," for discussion of the role of labor market tightness or slack on overall job creation. See also Bivens (2014) for a review of the literature on economic multipliers.

13. Pollin and Chakraborty (2020, Tables 1b and 2b) estimate that $683.1 billion in infrastructure and clean energy spending would support a total of 9.3 million new jobs, including direct, indirect, and induced spending. Our report estimates that $500 billion in infrastructure and clean energy and energy efficiency could support a total of 6.34 million jobs (including respending, Table 2, above). Adjusting for the 36.6% higher spending levels in Pollin and Chakraborty relative to this report's $500 billion spending package, overall projections shown in Table 2 are about 7.6% lower, in terms of jobs per billion dollars of spending, which is likely explained by small differences in multipliers (induced spending) in the two models. In addition, the BLS model used here is based on 2019 input–output tables, and the IMPLAN model used by Pollin and Chakraborty is based on 2018 input–output data. See the methodology appendix for further details.

14. The model is based on trade flows at the NAICS 4-digit level, which are aggregated into the 205-industry BLS model used for this study, as described in the appendix. These data are further aggregated into 52 sectors for presentation in Tables 2–4 (some of which with no data are omitted from Tables 2 and 3).

15. The personal consumer expenditures vector is one of the components of the Aggregate Final Demand data set that is included with the BLS input–output matrix files, as a component of "Nominal dollar input–output data for 1997–2019" (BLS-EP 2020b).

16. The table provides detailed information on jobs supported by industry and within industries. An additional fact not provided in the table but rather from unpublished analysis of the data is that within primary metals, 69,900 new jobs would be supported in the steel industry (NAICS 3311 and 3312).

17. Four industries show net jobs displaced by trade, and in three of those industries that translates into jobs displaced in the trade plus investments total.

18. Manufacturing and construction employ a substantially higher share of non-college-educated workers than other sectors of the economy. For example, in 2009–2011, 47.7% of manufacturing workers had a high school diploma or less education, compared with 37.6% of workers in all industries (Scott 2013, Table 1).

19. Profits are much lower in manufacturing industries, which produce 91.6% of products in this study. Hence, substitution of clean energy equipment for energy products will increase the labor share of

energy expenditures.

20. The model includes 205 NAICS industries. The trade data include only goods trade. Goods trade data are available for 85 commodity-based industries, plus information (publishing and software, NAICS industry 51), waste and scrap, used or secondhand merchandise, and goods traded under special classification provisions (e.g., goods imported from and returned to Canada; small, unclassified shipments). Trade in scrap, used, and secondhand goods has no impact on employment in the BLS model. Some special classification provision goods are assigned to miscellaneous manufacturing. Most trade in the special classifications provisions is small package trade that enters duty free, and involves products that are not classified.

21. The U.S. Census Bureau uses its own table of definitions of industries. These are similar to NAICS-based industry definitions, but at a somewhat higher level of aggregation. For this study, we develop a crosswalk from NAICS to Census industries, and we use population estimates from the ACS for each cell in this matrix. The ACS data we obtain from the Census Bureau for this project includes 44 unique sectors, plus subtotals for manufacturing, and for total employment. Trade and job loss coefficients are estimated using data only for the 44 unique sectors, across states and congressional districts.

22. According to the U.S. Census Bureau, only Colorado and Pennsylvania had congressional district boundary changes for the 116th Congress.

References

American Society of Civil Engineers (ASCE). 2017. *2017 Infrastructure Report Card*.

Bivens, Josh. 2012. *Green 'Sequester' is Already Costing U.S. jobs: Job Losses from Ongoing Clean-tech Cuts Will Rival Those from Defense Cuts*. Economic Policy Institute, December 2012.

Bivens, Josh. 2014. *The Short- and Long-Term Impact of Infrastructure Investments on Employment and Economic Activity in the U.S. Economy.* Economic Policy Institute, July 2014.

Bergsten, C. Fred, and Joseph E. Gagnon. 2012. *Currency Manipulation, the U.S. Economy, and the Global Economic Order*. (Policy Brief 12-25), Peterson Institute for International Economics, December 2012.

Bronfenbrenner, Kate, and Stephanie Luce. 2004. *The Changing Nature of Corporate Global Restructuring: The Impact of Production Shifts on Jobs in the U.S., China, and Around the Globe*. Commissioned research paper for the U.S. Trade Deficit Review Commission.

Bureau of Labor Statistics (BLS). 2020a. "Employment, Hours, and Earnings from the Current Employment Statistics (National)" (Excel spreadsheets). Accessed September 21, 2020.

Bureau of Labor Statistics (BLS). 2020b. "Table A-11. Unemployed Persons by Reason of Unemployment." Accessed September 29, 2020.

Bureau of Labor Statistics, Employment Projections program (BLS-EP). 2020a. "Nominal Domestic Employment Requirements Table for 2019" [Excel sheet, converted to Stata data file]. In *Historical Employment Requirements Tables, 1997–2019* [data series]. Last modified June 10, 2020.

Bureau of Labor Statistics, Employment Projections program (BLS-EP). 2020b. "Inter-industry relationships (Input Output matrix): Nominal Final Demand Aggregate Data." [Excel sheet]. Last modified June 10, 2020.

Chakraborty, Shouvik. 2020. Personal communication with Robert Scott, August 31, 2020.

Chomsky, Noam, and Robert Pollin, with C.J. Polychroniou. 2020. *Climate Crisis and the Global Green New Deal: The Political Economy of Saving the Planet*. London and New York: Verso.

Congressional Budget Office (CBO). 2020. "An Update to the Economic Outlook: 2020 to 2030 (10 year Economic Projections)." (Report), Congressional Budget Office, July 2, 2020.

Data Planet. 2019. "American Community Survey, 5-year Estimates: About the ACS 5-year Estimates" (web portal for exploring ACS data). Last updated December 18, 2019.

Federal Reserve Board. 2020. "Foreign Exchange Rates – H.10: Real Broad Dollar Index – Monthly Index" (data table). Accessed September 14, 2020.

Hansen, John R. 2017. "Why the Market Access Charge is Necessary to Fix Trade Imbalances." Coalition for a Prosperous America. September 2017.

Kimball, Will, and Robert E. Scott. 2014. *China Trade, Outsourcing and Jobs: Growing U.S. Trade Deficit with China Cost 3.2 Million Jobs between 2001 and 2013, with Job Losses in Every State*. Economic Policy Institute Briefing Paper no. 385, December 2014.

Lee, Thea. 2020. "HEROES Act Provides Critical Relief and Recovery Measures to U.S. Workers." (Statement). Economic Policy Institute, May 12, 2020.

Osterholm, Michael T., and Neel Kashkari. 2020. "Here's How to Crush the Virus Until Vaccines Arrive: To Save Lives, and Save the Economy, We Need Another Lockdown." *New York Times*, August 7, 2020.

Paul, Scott. 2020. *Our American Manufacturing Plan Will Create 6.9 to 12.9 Million New Jobs by 2024*, Alliance for American Manufacturing. October, 2020.

Pollin, Robert, James Heintz, and Heidi Garrett-Peltier. 2009. *How Infrastructure Investments Support the U.S. Economy*. Political Economy Research Institute, University of Massachusetts Amherst, January 2009.

Pollin, Robert, Heidi Garrett-Peltier, James Heintz, and Bracken Hendricks. 2014. *Green Growth: A U.S. Program for Controlling Climate Change and Expanding Job Opportunities.* Center for American Progress and Political Economy Research Institute, University of Massachusetts Amherst, September 2014.

Pollin, Robert, and Shouvik Chakraborty. 2020. *Job Creation Estimates Through Proposed Economic Stimulus Measures*. Political Economy Research Institute, University of Massachusetts Amherst, September 2020.

Scott, Robert E. 2009. "Re-Balancing U.S. Trade and Capital Accounts." Economic Policy Institute, Working Paper no. 286, December 2009.

Scott, Robert E. 2013. *Trading Away the Manufacturing Advantage: China Trade Drives Down U.S. Wages and Benefits and Eliminates Good Jobs for U.S. Workers*. Economic Policy Institute, September 2013.

Scott, Robert E. 2017a. *Growth in U.S.–China Trade Deficit between 2001 and 2015 Cost 3.4 million Jobs: Here's How to Rebalance Trade and Rebuild American Manufacturing*. Economic Policy Institute, January 2017.

Scott, Robert E. 2017b. "We Still Haven't Recovered Well-Paying Construction and Manufacturing

Jobs." *Economic Snapshot*, Economic Policy Institute, August 16, 2017.

Scott, Robert E. 2019. "Trade Wars and the Over-Valued Dollar." *The Hill*, August 9, 2019.

Scott, Robert E. 2020. *We Can Reshore Manufacturing Jobs, but Trump Hasn't Done It: Trade Rebalancing, Infrastructure, and Climate Investments Could Create 17 Million Good Jobs and Rebuild the American Economy*. Economic Policy Institute, August 2020.

Scott, Robert E., and Zane Mokhiber. 2018. *The China Toll Deepens: Growth in the Bilateral Trade Deficit between 2001 and 2017 Cost 3.4 Million U.S. Jobs, with Losses in Every State and Congressional District.* Economic Policy Institute, December 2018.

Scott, Robert E., and Zane Mokhiber. 2020. *Growing China Trade Deficit Cost 3.7 Million American Jobs Between 2001 and 2018: Jobs Lost in Every U.S. State and Congressional District*. Economic Policy Institute, January 2020.

Sierra Club. 2020. *Millions of Good Jobs: A Plan for Economic Renewal*. May 2020.

U.S. Census Bureau. 2019. "American Community Survey: Special Tabulation over 44 industries, Covering 435 Congressional Districts and the District of Columbia (115th Congress Census Boundaries), Plus State and US Totals Based on ACS 2013 5-year file" [custom tabulation, spreadsheets received November 26, 2019; Rhode Island data received January 14, 2020].

U.S. International Trade Commission (USITC). 2020. *USITC Interactive Tariff and Trade DataWeb* [database]. Accessed September 2020.